

Claims

What is claimed is:

1. A method of forming a wellbore casing within a borehole that traverses a subterranean formation, comprising:

assembling a tubular liner by a process comprising:

coupling a multi-layer tubular insert assembly to a threaded portion of a first tubular member; and

coupling a threaded portion of a second tubular member to the threaded portion of the first tubular member and the multi-layer tubular insert;

positioning the tubular liner assembly within the borehole; and

radially expanding and plastically deforming the tubular liner assembly within the borehole;

wherein the multilayer tubular insert comprises:

a first tubular insert having a first modulus of elasticity; and

a second tubular insert coupled to the first tubular insert having a second modulus of elasticity;

wherein the first modulus of elasticity is different from the second modulus of elasticity.

2. The method of claim 1, wherein the first and second tubular inserts comprise metallic materials.

3. The method of claim 2, wherein the first tubular insert comprises copper; and wherein the second tubular insert comprises cadmium.

4. The method of claim 1, wherein the modulus of elasticities of the first and second tubular inserts are less than the modulus of elasticities of the first and second tubular members.

5. A method of forming a wellbore casing within a borehole that traverses a subterranean formation, comprising:

assembling a tubular liner by a process comprising:

coupling a multilayer tubular insert assembly to a threaded portion of a first tubular member; and

coupling a threaded portion of a second tubular member to the threaded portion of the first tubular member and the multilayer tubular insert;

positioning the tubular liner assembly within the borehole; and

radially expanding and plastically deforming the tubular liner assembly within the borehole;

one of the layers of the multilayer tubular insert providing a fluidic seal after radially expanding and plastically deforming the tubular liner assembly; and another one of the layers of the multilayer insert providing a micro fluidic seal after radially expanding and plastically deforming the tubular liner assembly.

6. The method of claim 1, wherein the modulus of elasticity for at least one of the tubular inserts is less than the modulus of elasticity of the first and second tubular members.

7. The method of claim 5, wherein the modulus of elasticity for at least one of the layers of the multilayer insert is less than the modulus of elasticity of the first and second tubular members.

8. The method of claim 1, wherein the melting point for at least one of the tubular inserts prior to the radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.

9. The method of claim 5, wherein the melting point for at least one of the layers of the multilayer insert prior to the radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.

10. The method of claim 1, wherein at least one of the tubular inserts releases energy during the radial expansion and plastic deformation.

11. The method of claim 5, wherein at least one of the layers of the multilayer insert releases energy during the radial expansion and plastic deformation.

12. The method of claim 1, wherein assembling the tubular liner further comprises: coupling a tubular sleeve to the first and second tubular member.

13. The method of claim 12, wherein the sleeve receives the first and second tubular members.

14. The method of claim 12, wherein the sleeve is received within the first and second tubular members.

15. The method of claim 1, wherein assembling the tubular liner further comprises: concentrating contact stresses between the first and second tubular member.

16. The method of claim 5, wherein assembling the tubular liner further comprises: coupling a tubular sleeve to the first and second tubular member.
17. The method of claim 16, wherein the sleeve receives the first and second tubular members.
18. The method of claim 16, wherein the sleeve is received within the first and second tubular members.
19. The method of claim 5, wherein assembling the tubular liner further comprises: concentrating contact stresses between the first and second tubular member.
20. A method of forming a wellbore casing within a borehole that traverses a subterranean formation, comprising:
 - assembling a tubular liner by a process comprising:
 - coupling a multi-layer tubular insert assembly to a threaded portion of a first tubular member; and
 - coupling a threaded portion of a second tubular member to the threaded portion of the first tubular member and the multi-layer tubular insert;
 - positioning the tubular liner assembly within the borehole; and
 - radially expanding and plastically deforming the tubular liner assembly within the borehole.
21. The method of claim 20, wherein assembling the tubular liner further comprises: coupling a tubular sleeve to the first and second tubular member.
22. The method of claim 21, wherein the sleeve receives the first and second tubular members.
23. The method of claim 21, wherein the sleeve is received within the first and second tubular members.
24. The method of claim 20, wherein assembling the tubular liner further comprises: concentrating contact stresses between the first and second tubular member.
25. The method of claim 20, wherein the modulus of elasticity for at least one of the layers of the multilayer insert is less than the modulus of elasticity of the first and second tubular members.

26. The method of claim 20, wherein the melting point for at least one of the layers of the multilayer insert prior to the radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
27. The method of claim 20, wherein at least one of the layers of the multilayer insert releases energy during the radial expansion and plastic deformation.
28. A method of forming a wellbore casing within a borehole that traverses a subterranean formation, comprising:
 - assembling a tubular liner by a process comprising:
 - coupling a multi-layer tubular insert assembly to an end of a first tubular member;
 - and
 - coupling an end of a second tubular member to the end of the first tubular member and the multi-layer tubular insert;
 - positioning the tubular liner assembly within the borehole; and
 - radially expanding and plastically deforming the tubular liner assembly within the borehole.
29. The method of claim 28, wherein assembling the tubular liner further comprises:
 - coupling a tubular sleeve to the first and second tubular member.
30. The method of claim 28, wherein assembling the tubular liner further comprises:
 - concentrating contact stresses between the first and second tubular member.
31. The method of claim 28, wherein the melting point for at least one of the layers of the multilayer insert prior to the radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
32. The method of claim 28, wherein at least one of the layers of the multilayer insert releases energy during the radial expansion and plastic deformation.
33. The method of claim 28, wherein the multilayer tubular insert comprises:
 - a first tubular insert having a first modulus of elasticity; and
 - a second tubular insert coupled to the first tubular insert having a second modulus of elasticity;

wherein the first modulus of elasticity is different from the second modulus of elasticity.

34. The method of claim 33, wherein the first and second tubular inserts comprise metallic materials.
35. The method of claim 34, wherein the first tubular insert comprises copper; and wherein the second tubular insert comprises cadmium.
36. The method of claim 33, wherein the modulus of elasticities of the first and second tubular inserts are less than the modulus of elasticities of the first and second tubular members.
37. A method of forming a wellbore casing within a borehole that traverses a subterranean formation, comprising:
 - assembling a tubular liner by a process comprising:
 - coupling an end of a first tubular member to an end of a second tubular member;
 - and
 - coupling a tubular sleeve to the ends of the first and second tubular members;
 - positioning the tubular liner assembly within the borehole; and
 - radially expanding and plastically deforming the tubular liner assembly within the borehole;
 - wherein coupling the tubular sleeve to the ends of the first and second tubular members comprises applying magnetic energy to the tubular sleeve.
38. A tubular liner apparatus, comprising:
 - a first tubular member comprising a threaded portion;
 - a multi-layer tubular insert coupled to the threaded portion of the first tubular member;
 - and
 - a second tubular member comprising a threaded portion coupled to the threaded portion of the first tubular member and the multi-layer tubular insert;

wherein the multilayer tubular insert comprises:

 - a first tubular insert having a first modulus of elasticity; and
 - a second tubular insert coupled to the first tubular insert having a second modulus of elasticity;

wherein the first modulus of elasticity is different from the second modulus of elasticity.
39. The apparatus of claim 38, wherein the first and second tubular inserts comprise metallic materials.
40. The apparatus of claim 39, wherein the first tubular insert comprises copper; and wherein the second tubular insert comprises cadmium.

41. The apparatus of claim 38, wherein the modulus of elasticities of the first and second tubular inserts are less than the modulus of elasticities of the first and second tubular members.
42. The apparatus of claim 38, wherein the melting point for at least one of the tubular inserts prior to a radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
43. The apparatus of claim 38, wherein at least one of the tubular inserts releases energy during a radial expansion and plastic deformation.
44. The apparatus of claim 38, wherein the apparatus further comprises:
 - a tubular sleeve coupled to the first and second tubular member.
45. The apparatus of claim 44, wherein the sleeve receives the first and second tubular members.
46. The apparatus of claim 44, wherein the sleeve is received within the first and second tubular members.
47. The apparatus of claim 38, wherein the apparatus further comprises:
 - means for concentrating contact stresses between the first and second tubular members.
48. A tubular liner apparatus, comprising:
 - a first tubular member comprising a threaded portion;
 - a multi-layer tubular insert coupled to the threaded portion of the first tubular member;
 - and
 - a second tubular member comprising a threaded portion coupled to the threaded portion of the first tubular member and the multi-layer tubular insert;

wherein one of the layers of the multilayer tubular insert provide a fluidic seal; and

wherein another one of the layers of the multilayer insert provide a micro fluidic seal.
49. The apparatus of claim 48, wherein the modulus of elasticity for at least one of the layers of the multilayer insert is less than the modulus of elasticity of the first and second tubular members.

50. The apparatus of claim 48, wherein the melting point for at least one of the layers of the multilayer insert prior to a radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
51. The apparatus of claim 48, wherein at least one of the layers of the multilayer insert releases energy during a radial expansion and plastic deformation.
52. The apparatus of claim 48, further comprising:
 - a tubular sleeve coupled to the first and second tubular member.
53. The apparatus of claim 52, wherein the sleeve receives the first and second tubular members.
54. The apparatus of claim 52, wherein the sleeve is received within the first and second tubular members.
55. The apparatus of claim 48, further comprising:
 - means for concentrating contact stresses between the first and second tubular member.
56. A tubular liner apparatus, comprising:
 - a first tubular member comprising a threaded portion;
 - a multi-layer tubular insert coupled to the threaded portion of the first tubular member;
 - and
 - a second tubular member comprising a threaded portion coupled to the threaded portion of the first tubular member and the multi-layer tubular insert.
57. The apparatus of claim 56, wherein the apparatus further comprises:
 - a tubular sleeve coupled to the first and second tubular member.
58. The apparatus of claim 57, wherein the sleeve receives the first and second tubular members.
59. The apparatus of claim 57, wherein the sleeve is received within the first and second tubular members.
60. The apparatus of claim 56, further comprising:
 - means for concentrating contact stresses between the first and second tubular member.

61. The apparatus of claim 56, wherein the modulus of elasticity for at least one of the layers of the multilayer insert is less than the modulus of elasticity of the first and second tubular members.
62. The apparatus of claim 56, wherein the melting point for at least one of the layers of the multilayer insert prior to a radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
63. The apparatus of claim 56, wherein at least one of the layers of the multilayer insert releases energy during a radial expansion and plastic deformation.
64. A tubular liner apparatus, comprising:
 - a first tubular member;
 - a multi-layer tubular insert coupled to the first tubular member; and
 - a second tubular member coupled to the first tubular member and the multi-layer tubular insert.
65. The apparatus of claim 64, further comprising:
 - a tubular sleeve coupled to the first and second tubular member.
66. The apparatus of claim 64, further comprising:
 - means for concentrating contact stresses between the first and second tubular member.
67. The apparatus of claim 64, wherein the melting point for at least one of the layers of the multilayer insert prior to a radial expansion and plastic deformation is less than the melting point after the radial expansion and plastic deformation.
68. The apparatus of claim 64, wherein at least one of the layers of the multilayer insert releases energy during a radial expansion and plastic deformation.
69. The apparatus of claim 64, wherein the multilayer tubular insert comprises:
 - a first tubular insert having a first modulus of elasticity; and
 - a second tubular insert coupled to the first tubular insert having a second modulus of elasticity;

wherein the first modulus of elasticity is different from the second modulus of elasticity.

70. The apparatus of claim 69, wherein the first and second tubular inserts comprise metallic materials.
71. The apparatus of claim 70, wherein the first tubular insert comprises copper; and wherein the second tubular insert comprises cadmium.
72. The apparatus of claim 69, wherein the modulus of elasticities of the first and second tubular inserts are less than the modulus of elasticities of the first and second tubular members.